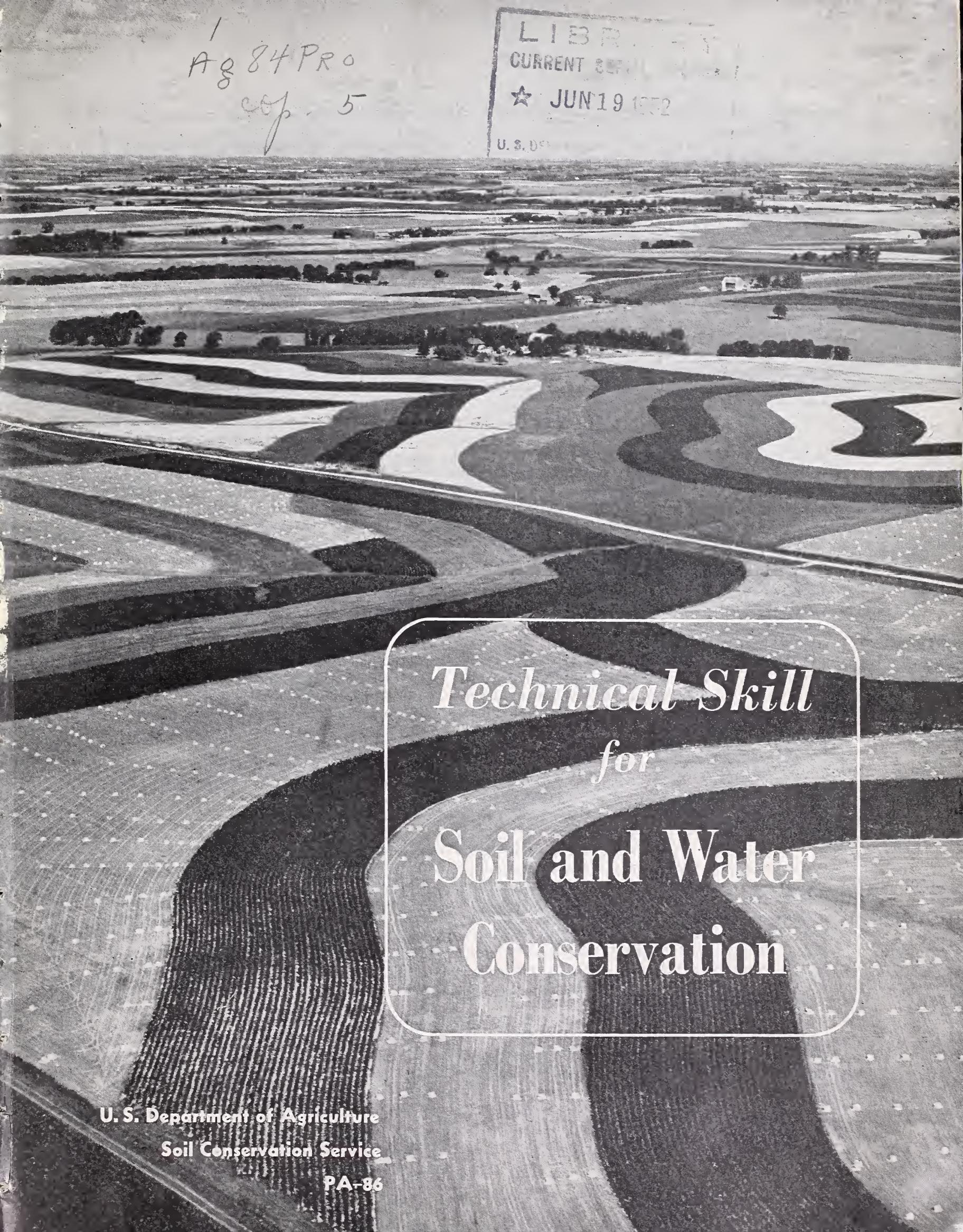
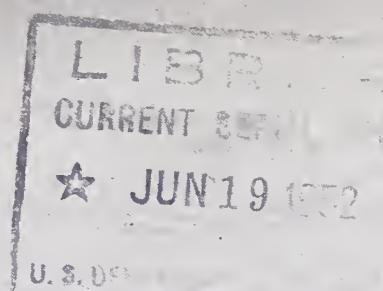


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Technical Skill
for
Soil and Water
Conservation

U. S. Department of Agriculture
Soil Conservation Service

PA-86

Foreword

The conservation of our remaining land and water resources is the most important problem confronting American agriculture. It is not a problem that should wait until farmers solve it by the trial-and-error method—that may be too late. This is an urgent problem that demands the best efforts of all the Nation's scientists, as well as those who farm the land. And it is a job that requires scientific knowledge and technical skill to do it right.

Most farmers of the Nation now recognize the importance of soil and water conservation. They are practicing conservation more and more each year. Farmers and landowners have organized more than 2,100 soil-conservation districts in the United States and its possessions (1949). These districts cover more than 1,100,000,000 acres and include more than three-fourths of all the farms and ranches of the country. Around 700,000 farmers and ranchers in these districts have made detailed conservation plans with the aid of trained soil conservation technicians. They are carrying out all types of land use and conservation practices needed on their farms and ranches in cooperation with their soil conservation districts. And there are many other farmers who are using some type of soil and water conservation practice. Furthermore, many farmers who are not practicing conservation might do so if they knew what to do and how to do it. And many of those who are now using some conservation measures might use more if they knew exactly what was needed.

Many soil conservation measures, especially annual farm practices, are so simple that farmers need no technical assistance in applying them. Control of weeds, for example, while not always easy, usually is simple in method and generally beneficial in effect. Barnyard manure is so generally beneficial to crops it can be used freely wherever available. Its application is a matter of simple mechanics. Lime also is almost always helpful on land having a pH value of 5.5 or less; it is applied with simply operated lime spreaders. Cover crops provide needed protection to cultivated land during those periods when the regular crops are not growing or are too small to give substantial protection against erosion and leaching. Usually no particular difficulty is involved in their use.

But the principal soil-conservation measures are complicated in their application and call for thorough technical understanding of their purposes and of how to apply them. They are generally used in combination with one another, and each must fit the land in a pattern of mutual support. Their application always must conform with the principles of hydrology, engineering, and agronomy. Both training and experience are necessary here. No amount of in-door training can take the place of actual experience on the land in this connection. Under varying conditions of topography and drainage, the wrong thing done, or the right thing left undone, on any part of the farm can do serious injury to the entire farm.

Under the program of the Soil Conservation Service in assisting farmers in soil conservation districts throughout the country, around a hundred proved major conservation measures are being used in order to get the job done scientifically—acre by acre, according to kind and need of the land. Not all these measures are used on every individual farm, of course, but all are required to meet the collective needs of all the land on all the Nation's farms. And, along with these more complex practices, go many relatively simple practices.

This Service works on the basis of the individual farm, treating every acre of every farm. The work is based on an accurate inventory of the land and on a sound, long-time conservation plan. Special types of technical skill are always required to make a scientific land inventory that clearly defines the capabilities and the conservation needs of each acre of land and to develop a sound conservation plan for the land.

Many farmers are coming to realize that they need special technical help in planning and applying adequate soil and water conservation programs for their farms. Farmers in soil conservation districts have been requesting such help faster than their districts have been able to supply it during recent years. But there are still some farmers, and others, who do not recognize that conservation of soil and water is a science. They don't seem to realize that most conservation measures will fail unless they are sound and are properly applied. The measures must be applied in accordance with the best known scientific and technical standards, if they are to do the job for which they were intended. And too many people still think of soil conservation in terms of using certain individual practices without proper consideration of other supporting measures that may be needed to make the conservation program lasting and effective.

There is but one way to do soil and water conservation work so that it will be effective and permanent. The work must be done on whole farms, acre by acre, according to the land's capabilities and needs. Such treatment demands scientific and technical accuracy that can ordinarily be supplied only by technicians trained in soil conservation.

H. H. BENNETT,
Chief, Soil Conservation Service.

December 23, 1949.
Slightly revised, June 1950.



**Technical Skill
for
Soil and Water Conservation**

IT TAKES SKILL to conserve the soil and water on most farm and range land. For some conservation practices you need only the same kind of skill that you use in ordinary good farming or ranching. But the proper use of many conservation measures requires a high degree of technical skill in engineering, agronomy, soil science, hydrology, forestry, biology, or some other scientific field. The over-all job of conservation involves such complex problems as erosion control, drainage, improvement of soil fertility, irrigation, range conservation, woodland management, wildlife conservation, and control of running water. It is a job that demands the knowledge and skill of experienced technicians who have special training in the science and art of soil and water conservation.

A GULLY CAN CAUSE A LOT OF TROUBLE

If you have ever tried to stop a gully that was eating its way up a draw in one of your fields, you know that you don't stop a live gully by haphazard methods. Dumping rubbish in a gully doesn't stop it; the water cuts around and under the rubbish. Plowing dirt into a gully is just a waste of soil. You control a gully by controlling the water that makes the gully; there is no other sure way to do it. You may control a gully by keeping the water out of it; you may control it by paving the sides and bottom with grass or other vegetation to keep water from cutting soil loose and washing it away; or you may install concrete or masonry structures that will drop the water safely to the bottom of the gully.

Keeping water out of a gully is not a simple matter. You can't stop the water from running downhill—not if there is much water. You must find some other place for the water to flow—a place where it will flow without making another gully. Then you must make the water

flow there. This usually means that you must build a diversion dike or ditch at the head of the gully to lead the water to where you want it.

How big should you make the diversion ditch? What grade should you give it? Part of the answer to these questions depends on how much water you must divert during the heaviest rains. How far is it from the head of the gully to a well-sodded pasture or meadow where you can safely empty the water? Perhaps a diversion is not practical. You may have to let the water continue to flow down the draw and control the gully with vegetation or structures.

Getting grass or other vegetation to grow in the bottom of a gully that carries a big head of water every time it rains is not easy. You must find a means of holding the soil in place while the grass gets started. Maybe you can stabilize the gully banks by planting trees or shrubs. But you will probably have to build some dams or baffles to hold the soil while the grass gets started.

Controlling a gully with concrete or masonry struc-



You don't stop a gully by haphazard methods (left). If you don't check erosion your topsoil will soon be gone.

tures is a job for an experienced engineer. If the structures are not built right, they will probably wash out and then your gully will be worse than ever.

You have a technical problem on your hands, regardless of the method you use to stop a gully.

THERE ARE DIFFERENT WAYS TO STOP EROSION

If you have a sloping field that washes readily, you know that you must check erosion or your topsoil will soon be gone, and after that erosion will probably be faster than ever.

Contour tillage and stubble mulching with a good rotation may be all you need to check sheet erosion. The chances are that you will need strip crops or terraces or both if the field has a steep or long slope and the soil is highly erodible.

Have you ever used strip crops? Laying out a field for contour strip cropping may be a fairly simple job, and again it may not. The strips should be planned so that they will check erosion yet cause you the least possible trouble in farming.

Planning and building a successful terrace system may call for a great deal of technical skill. First you must provide suitable outlets for the terraces. If you don't have a pasture or meadow where you can empty the terraces, you must lay out and build a waterway. This may be just as technical a job as stopping a gully.

The terraces themselves must be the right distance

apart and have the correct grade. What this distance is depends on the slope of the land, the kind of soil, the climate, and the type of farming you expect to do. The grade depends on the spacing, size, and length of the terraces, the kind of soil, the climate, the type of farming, and kind of outlets you use. After the terraces are built, they should be carefully checked to make sure they are wide and high enough and have a channel large enough to handle all the water during the heaviest rains. And you should be sure there are no low spots in the ridges that will permit the water to break through and start a gully in the field.

Maybe your sloping field is not suited for cultivation at all and should be converted into pasture, meadow, or wood lot. Are you sure that you know the capabilities of the land? The field might return greater profits in the long run if you quit trying to cultivate it.

Yes; you may run into a lot of technical problems in trying to check erosion on a sloping field.

YOU MAY GUESS WRONG ABOUT WHAT YOUR SOIL NEEDS

If you are farming poor soil you know that it needs fertilizing to grow good crops. You also know that there is a big difference in fertilizers.

Plenty of superphosphate may be all you need. You probably need more than that, however. You may need a complete fertilizer. In addition, your soil may

need liming, and you may need to plow under a green-manure crop every year or two to build up the organic matter. Determining what kind and how much of fertilizers and soil amendments to use, and when to use them, is a technical problem. You need a soil test to tell you, for sure, what the soil needs and just how much fertilizer will be profitable.

IRRIGATION FARMING IS TECHNICAL

If you are an irrigation farmer, you probably have plenty of technical problems. Your land may need leveling, so that you can spread the water evenly over the fields with the least waste. Have you estimated the cost of leveling the land and how much water you would save? Is your soil deep enough for proper leveling?

Is your irrigation system the most economical for your farm? Irrigation engineers have developed many methods for improving irrigation systems during the last few years. If your system was laid out several years ago, it might pay you to have an irrigation engineer check it. You may want to revise it or even to adopt an entirely new system.

How about the length of your irrigation runs? If they are too long the crops at one end may get too much water, while those at the other end get too little. Also, if the runs are too long you may get serious erosion on sloping land. The length of the runs should be determined mainly by the slope of the land, the kind of

soil, the methods of irrigation, the volume of water available, and the kind of crops grown.

Are you sure that you are using the right amount of water at the right time for the crops you irrigate? In the last few years irrigation specialists have obtained a lot of new information about the water requirements for different crops. You may be paying for more water than you need; or you may be skimping where more water would return you a good profit.

How about alkali or drainage problems on your irrigated land? Is the water too saline? It is important to know about these things. They are technical problems, and you may have many others on an irrigated farm.

A DRAINAGE SYSTEM MUST BE BUILT RIGHT

Do you have some wet land that needs drainage? Have you planned the type of drainage system that will be best and cheapest? To plan the best drainage system you should know how deep your soil is and how fast water will drain from it. Also you should know how deep the main drains are and how much grade you can or should give your ditches or tile, and how far apart to space them to get good drainage with least interference in farming operations.

If your drainage system is not working right, you may need only to properly clean and maintain the ditches. But you may need to overhaul it completely.

If an irrigation system isn't designed right, part of the land may be flooded (left) while other land gets too little water. You need an accurate survey and plan for a drainage system (right).



A lot of drainage systems that were installed several years ago need overhauling.

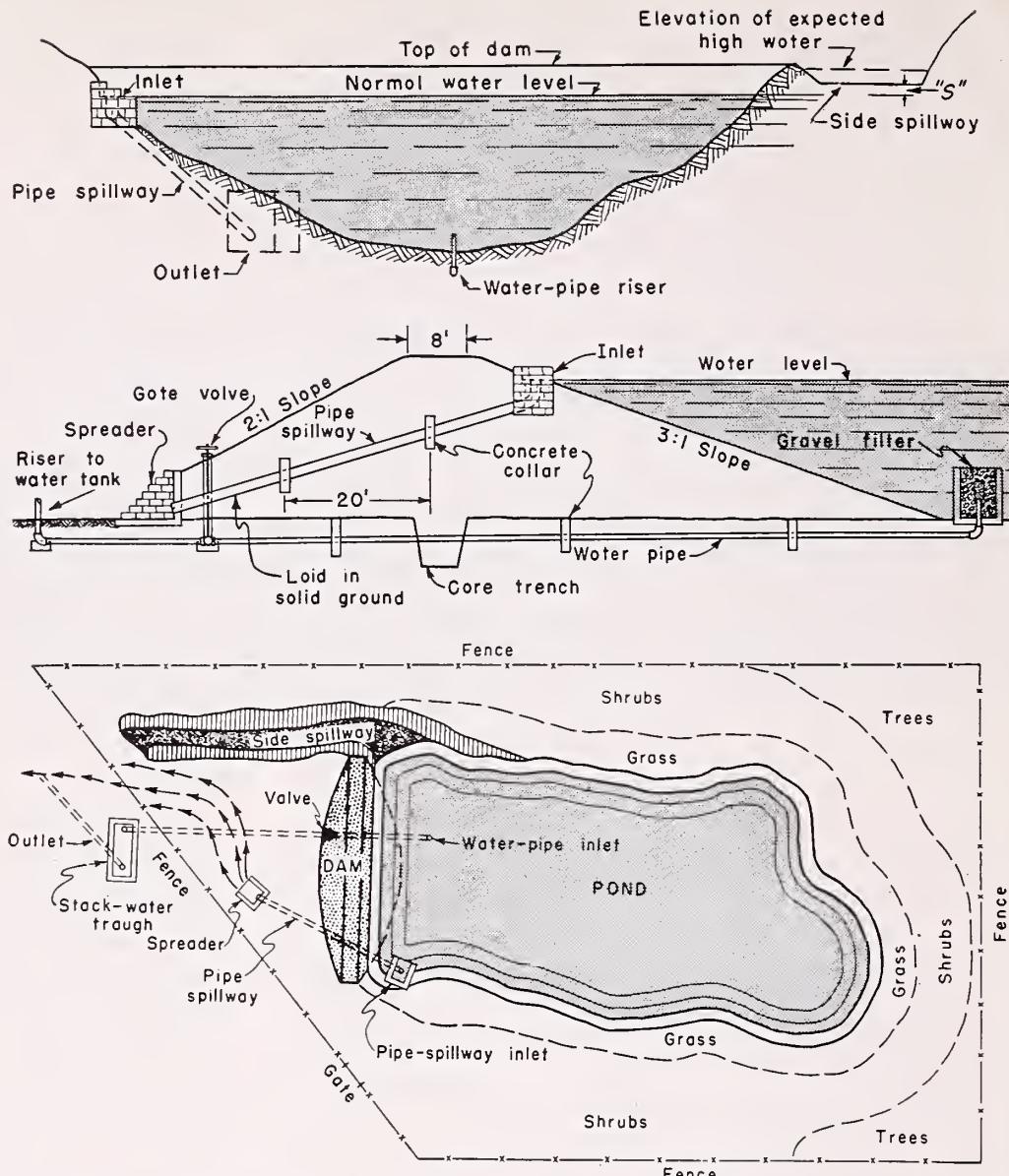
Whether you are going to install a new system or overhaul your present drainage system, you need an accurate survey of the land and a special drainage plan. You need an experienced drainage engineer to plan and design a drainage system. You can't afford to compromise about a drainage ditch. If you are off only an inch or two on the survey work, you may find that the water doesn't run in the right direction.

RANGE CONSERVATION MAY BE TECHNICAL

If mesquite or other brush is getting thicker on your range, you have a technical problem in trying to get rid of it. There are several ways to control brush on a range; most are expensive. Some are suited to certain types of ranges but are not effective on others. If you haven't made a thorough study of the cost and effectiveness of the different brush-control methods, it may pay you to consult a range conservationist who has had a lot of experience with obstinate brush and brush sprouts.

Has the grass been getting thinner on some of your range? Do you notice fewer plants of the better grasses and more of the coarser grasses on some of it? Maybe you have been overgrazing a part of your range. Have you made an accurate survey of each pasture to determine how many animals it will graze without harm to the grass or land? An experienced range conservationist can help you analyze the land, vegetation, and condition of your ranges. From this information he can help you develop a systematic plan of grazing, so that you will get the maximum poundage of beef, mutton, or wool while the range gets better instead of worse.

Do you need more stock-watering places? Do you have some areas where water-spreading structures could catch the runoff from steep land and spread it over



You should have accurate engineering plans to construct a pond.

flatter areas? Do you have some range that might benefit from contour furrowing, pitting, or reseeding?

HAVE YOU EVER BUILT A FARM POND?

If you have ever built a farm pond, you know that many technical problems come up. The site for the pond must be selected carefully, so that its construction will be simple and the underlying soil will hold water. A knowledge of the geology of the region, particularly of the underlying rocks, is helpful.

You need accurate information about the watershed that drains into the pond. The watershed should be covered with grass or trees to prevent excessive silting. You should know how much runoff to expect from the watershed. This will depend mainly on its size, the slope of the land, the kind of cover, and how fast the water will go into the soil. Some ponds never fill up

because there isn't enough runoff from the watershed. Other ponds fail because the spillway and dam were not designed for the amount of runoff.

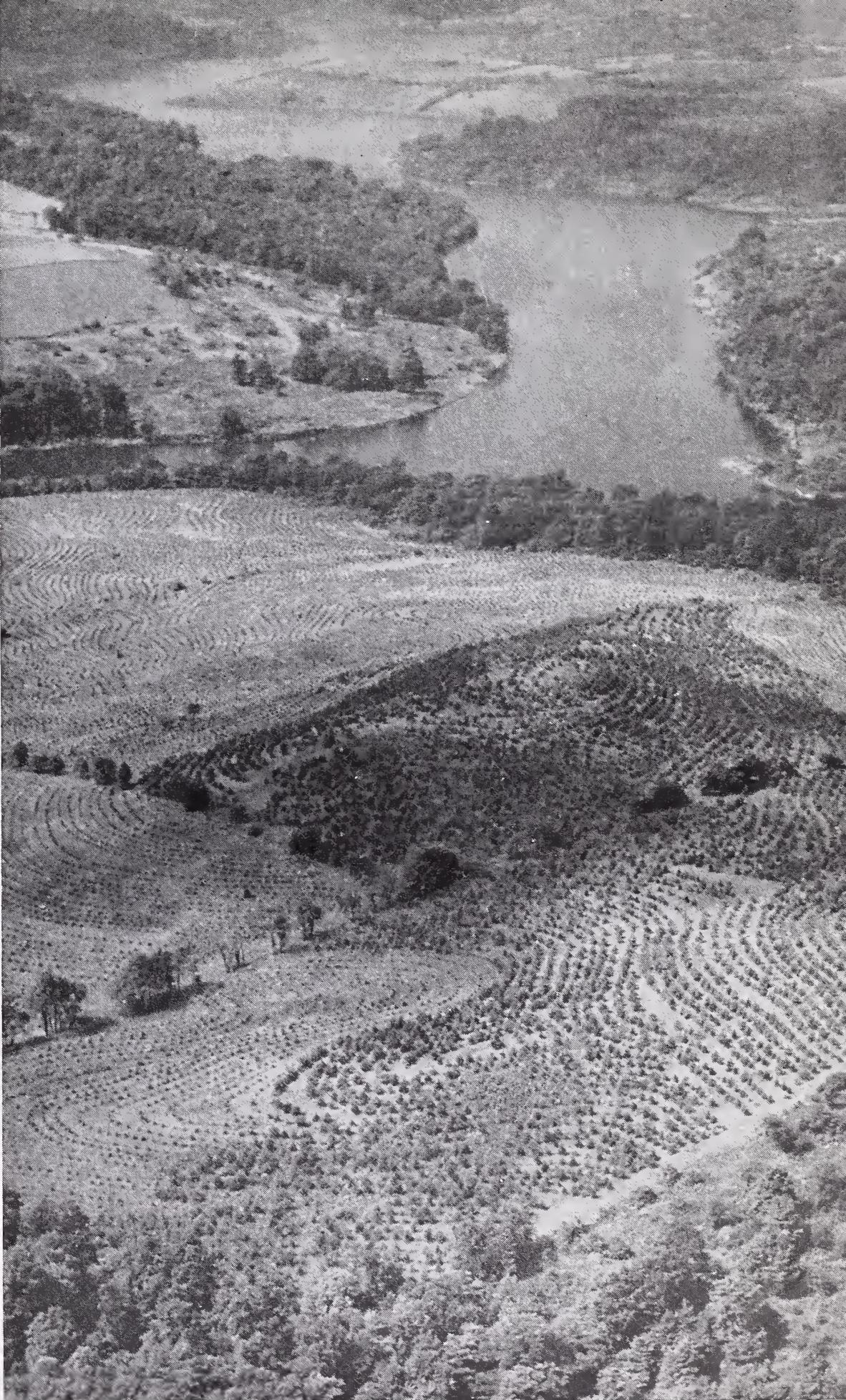
You must have accurate plans for construction of both the dam and the spillway. The dam may need a core trench, depending on the kind of soil you are using. If you have any cultivated land in the watershed, you will probably need a desilting basin. If you intend to use the water in the pond for stock water or irrigation, you will need to plan for a water pipe. If you intend to raise fish in it, you need to know what kinds and how many fish to stock it with. How about fertilizing for greater fish production? These are but a few of the technical problems you may encounter in building a pond.

DO YOU HAVE A FLOOD PROBLEM?

Do you have some bottom land that overflows frequently? Do your crops wash out or get covered with silt or sand? If so, the chances are that the entire watershed above your farm needs treatment to prevent such flood damage. And your farm probably needs proper treatment to prevent like damage to your neighbors' farms downstream.

Before you can make effective plans to reduce flood damages you need to know where most of the flood water comes from and which fields contribute most of the silt and sand. This means that to get the best results you must have an accurate physical survey of the whole watershed and a watershed work plan based on this information.

You can't treat each field or farm as if it were independent of the others and expect to get effective control over flood water and sediment. You must plan the con-



Dams and levees downstream help, but you also need to treat the watershed with conservation and water-control measures to control floods and flood damages.



EXPERIENCED TECHNICIANS AND SCIENTISTS of the Soil Conservation Service are helping farmers and ranchers through soil conservation districts.



RESEARCH



LAND INVENTORY

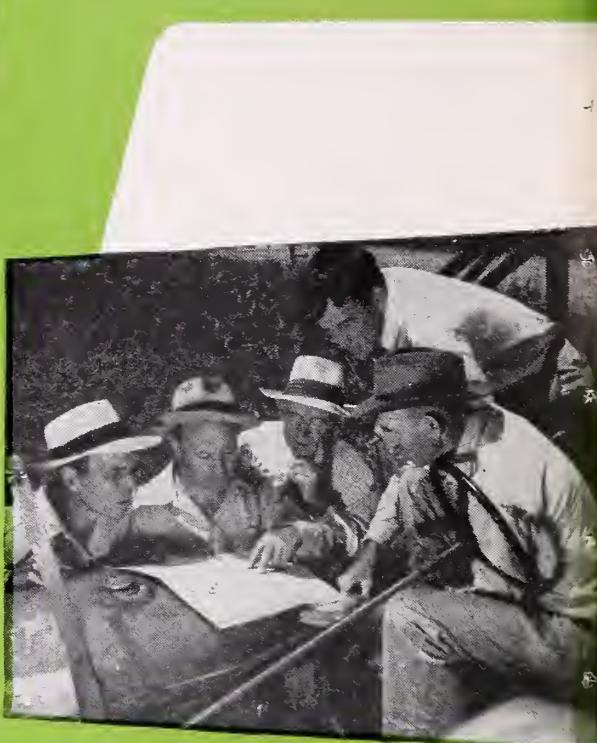


ENGINEERING

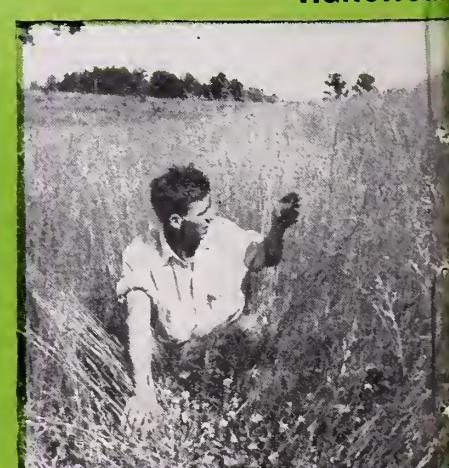


BIOLOGY

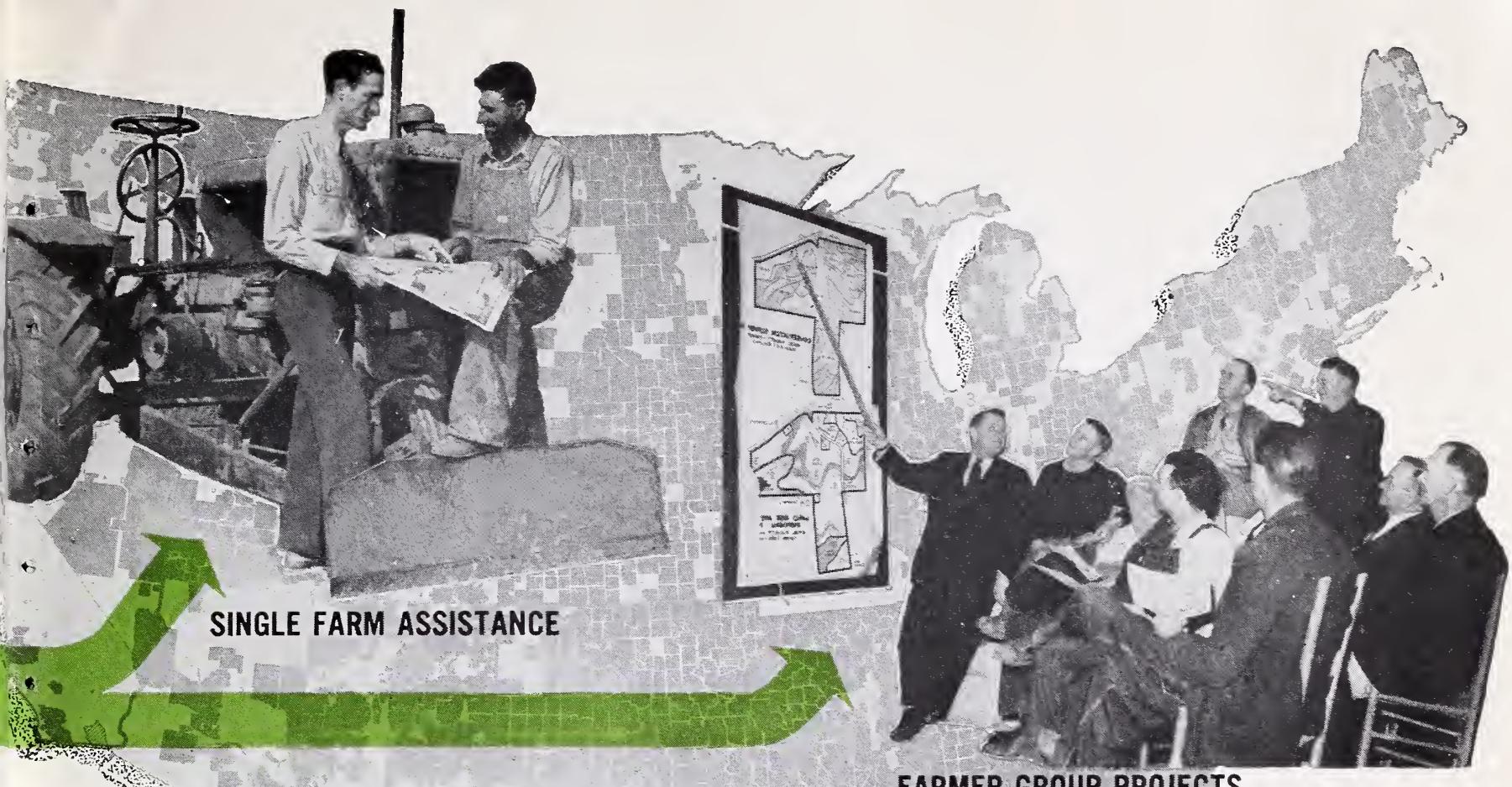
IRRIGATION



SOIL CONSERVATION DISTRICTS

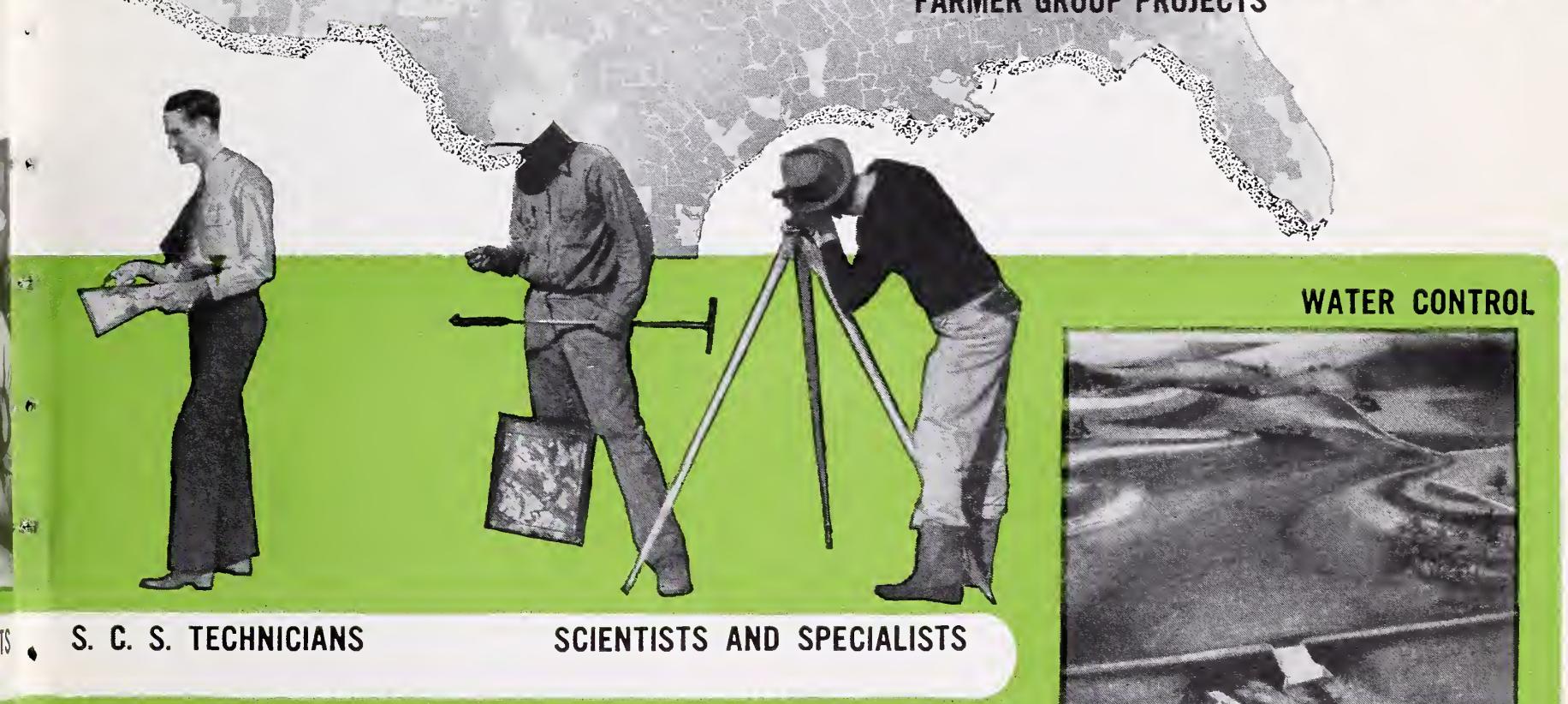


AGRONOMY



SINGLE FARM ASSISTANCE

FARMER GROUP PROJECTS



S. C. S. TECHNICIANS

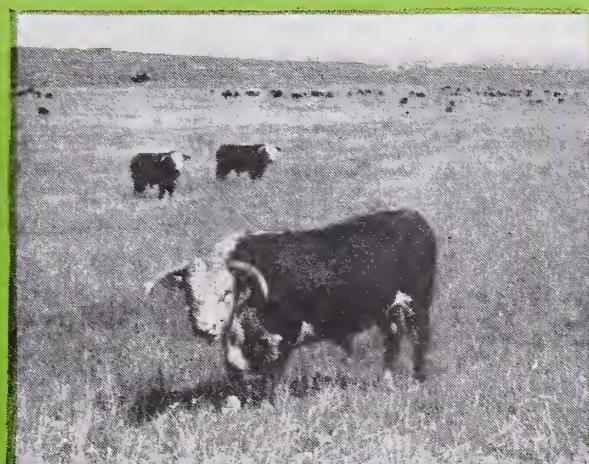
SCIENTISTS AND SPECIALISTS

WATER CONTROL

NURSERY

RANGE MANAGEMENT

DRAINAGE



servation and flood-control measures for each field and farm to fit the over-all problem of the watershed. All the erosion-control practices, waterways, gully-control measures, small floodwater-retarding dams, desilting basins, floodways, channel improvements, and other measures must be installed in the right combination and sequence with technical accuracy. If any measure fails to do the job for which it was intended, other measures in the watershed plan become less effective. They may even become totally ineffective.

MOST CONSERVATION WORK REQUIRES TECHNICAL SKILL

If you are a wheat farmer on the Great Plains, your main conservation problems probably are the control of wind erosion and moisture conservation. If you are a truck farmer in the East, you may be most interested in deciding whether it will pay you to irrigate during droughty summers and in finding out which system of irrigation will be best and cheapest. If your main crop is tobacco or potatoes, your main problem may be the proper laying out of row-grades for the near-contour ridges in your fields. If you are a dairy farmer, it may be management of the pasture, hay, and feed crops on your limited acreage. If you have much woodland, you may be most interested in getting a good stand of desirable kinds of trees on it. Technical skill is needed to do any of these conservation jobs right, just as it is needed on most other soil and water conservation problems.

CONSERVATION IS A SCIENCE

Soil and water conservation is a science; it involves scientific knowledge in many fields. Many types of technical skill are required to plan and install the various measures needed for a complete conservation farming or ranching program.

Research specialists of the Soil Conservation Service and cooperating State experiment stations have done much work on soil and water conservation problems during the last 20 years. They have discovered many new facts about the behavior of soil and water. They have developed improved techniques in conservation. They have accumulated a vast amount of scientific knowledge about land and water problems. For example, a trained technician can determine the probable amount of runoff from a watershed by evaluating its size, the slope of the land, the kind of soil, and the kind and amount of vegetation. Or he can figure the safe carrying capacity of a grass waterway accord-

ing to its size, grade, kind of soil, and type of vegetation. These are but two of the many technical problems that may now be solved with scientific accuracy because of recent research. Such information is available to anyone who can interpret and use it. It is practical information that can help solve many of the technical problems involved in conservation.

The Soil Conservation Service has a large group of technicians who are using and interpreting these research data. That is, they specialize in the science and techniques of soil and water conservation. Most of these technicians work with farmers in soil conservation districts. They help farmers make plans for and apply complete conservation treatment to their land. They are soil conservationists.

Of course, soil and water conservation is such a complicated science that no one person knows the answers to all the problems. These conservationists, however, know when to call for special technical aid and where to get it. The Soil Conservation Service has specialists in forestry, biology, engineering, ecology, agronomy, soil, drainage, irrigation, sedimentation, hydrology, geology, range management, and other sciences related to soil and water conservation. Such specialists help the soil conservationists on particular problems.

If you are a pretty good agricultural engineer and soil scientist and are up-to-date on the latest developments in agronomy, forestry, range conservation, biology, and the other sciences related to conservation, you won't need a soil conservation technician to help you. But if you are an average farmer or rancher you will need technical help on planning and installing some of the conservation measures needed on your farm.

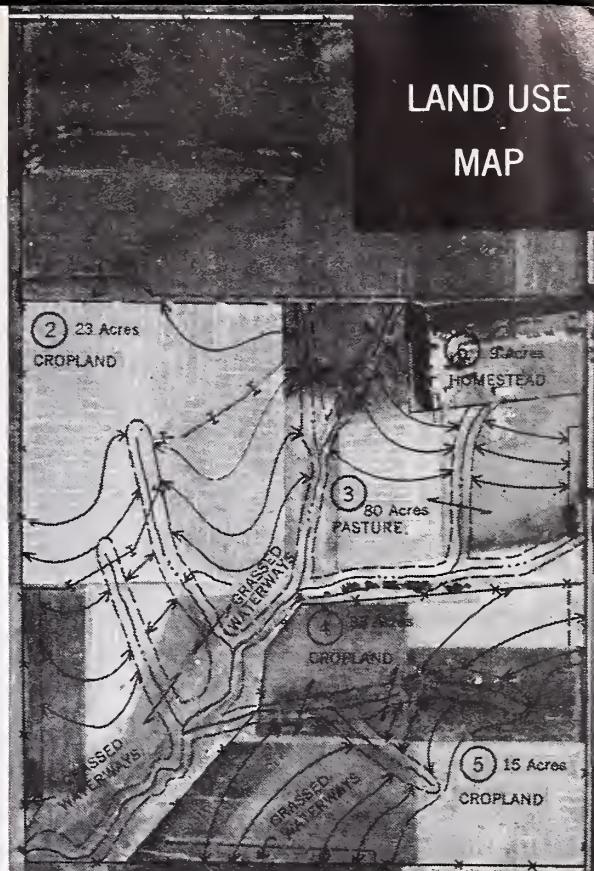
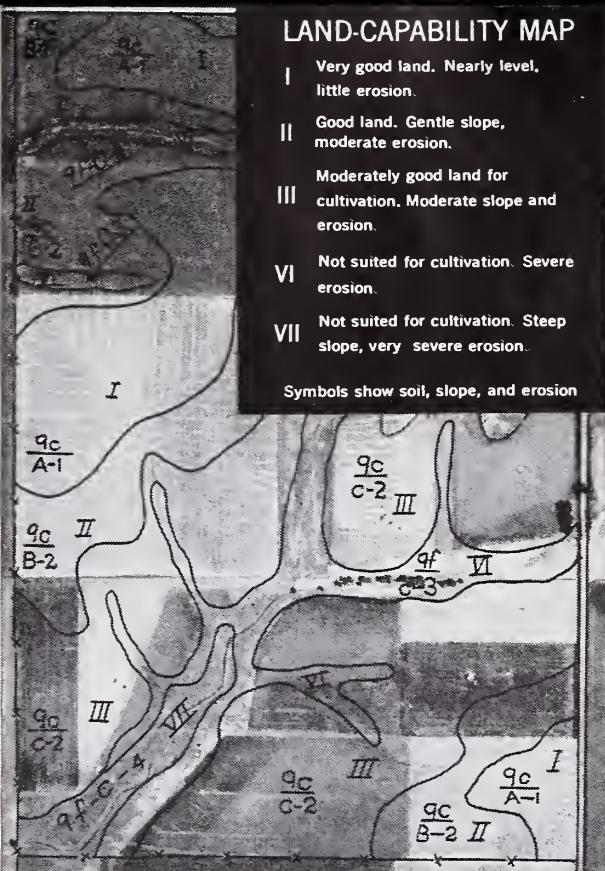
If your farm is in a soil conservation district, you can get the needed technical help through your district. You can get a land-capability map of your farm and help in making a conservation plan for it. And you can also get help in applying and maintaining those conservation practices that require special technical skill.

A SCIENTIFIC LAND INVENTORY

Do you know what each acre of your farm is capable of doing?

The first step in conservation farming is to start using each acre of land for a job that it is suited to do. Some land is suited for cultivation; some is best suited for grass or trees. On some of your cultivated land you must use a lot of conservation measures; on other land you need nothing but ordinary good farming methods. Each acre of land has its capabilities. It is

LAND USE BEFORE PLANNING



You must know the capability of the land to make a good conservation plan. Making a land-capability survey is a job for a technician.

capable of doing certain things for you, if you treat it right. But you must use each acre for a job it is capable of doing and treat it with the conservation measures it needs, if you expect it to last and to return a profit on your work.

The capabilities of land are determined mainly by the kind of soil, the slope of the land, the amount and kind of erosion, and the climate. But there are other things that may affect the capability of land. It may be rocky; it may overflow; it may have natural salt accumulations; or it may need drainage.

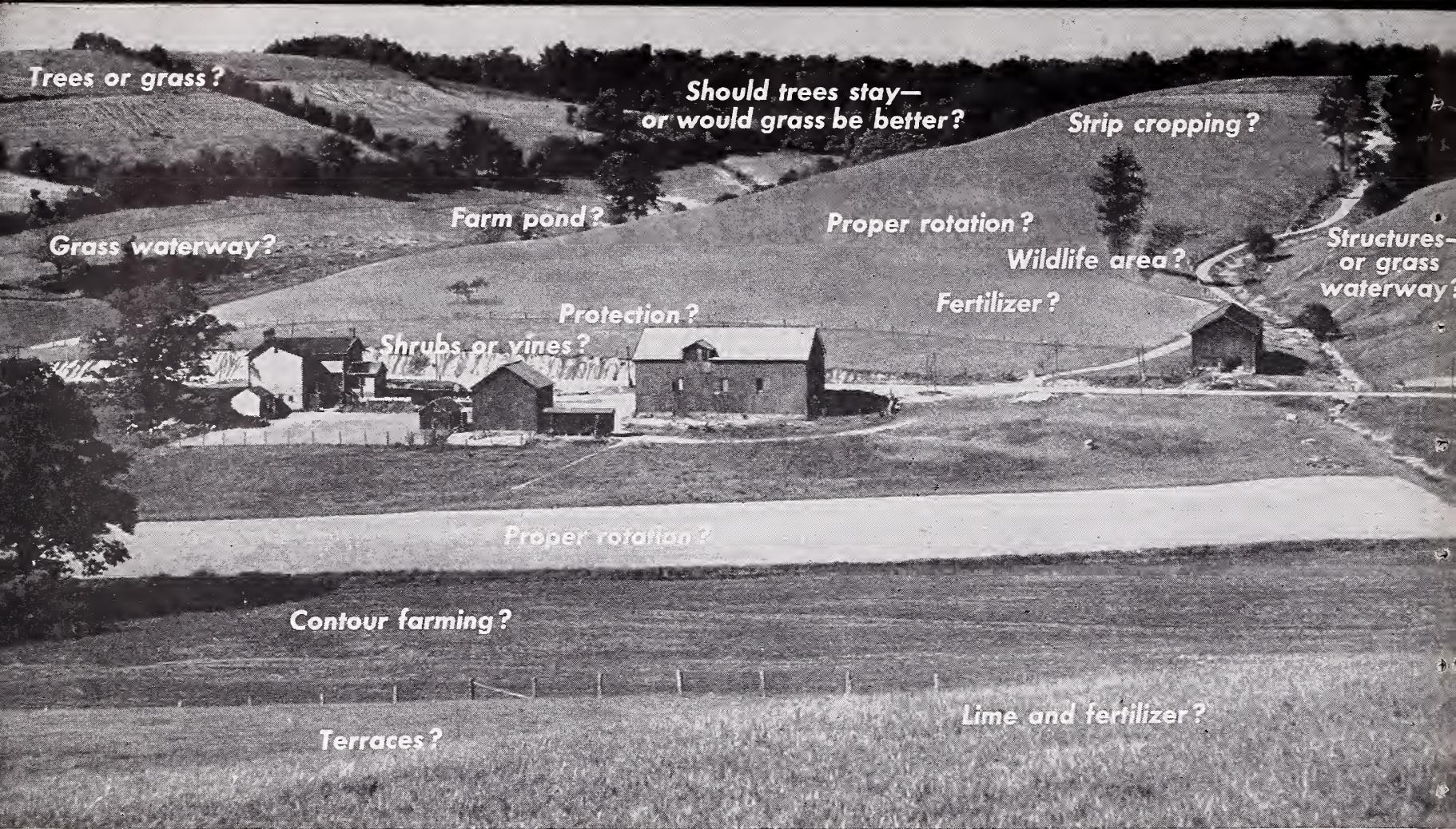
You can restore a depleted soil by adding fertilizer, organic matter, or lime where needed. You can clear trees, stumps, or brush from a field. The need for fertilizer and soil amendments to replace elements removed by crops or by leaching or the need to clear land before it can be cultivated do not determine the capability of the land. But even though you improve a soil in some ways, you can't change the kind of soil; you can't change the slope by any practical means; you can't change the climate; and you can't replace the topsoil, once it has washed away. These are the main things that determine the capability of your land.

How are you going to find out about the kind of soil, slope, erosion, and other things that determine the capability of your land? Of course, you can tell whether the soil is sandy or clayey. You can tell how

deep the soil is and what the subsoil is like by using a soil auger or a spade. You can measure the slope of the land with an Abney level or a farm level. You may be able to estimate the erosion by comparing the field with nearby land that has never been cultivated. But do you know how these things affect land capability?

It is safe to cultivate certain kinds of soil with a slope of 20 percent; it is unsafe to cultivate other soils with slopes of 10 percent. You can grow row crops safely with contour tillage, a good rotation, and stubble mulching on some land with 5-percent slope; other land with 5-percent slope needs strip cropping, terracing, or both if you are to grow row crops without danger of severe erosion. Some waterlogged land can be drained with a simple drainage system; other land requires expensive drainage measures; and some cannot be drained by any practical means. These are just a few of the problems to be solved in determining the capability of any given tract of land. But a good land-capability survey will tell you about these things. It will tell you not only what you can use the land for but also what conservation measures you need.

Making a land-capability survey is a job for a technician. He must have scientific knowledge about the various kinds of soil; he must know how to measure slope and erosion; and he must be able to recognize other features that will affect land capability. He



Do you know what each acre of land on your farm is best suited to do and which conservation measures will be best for each field?

must know how to calculate the effects of all these things on the use of the land. And he should be skilled in making maps that are accurate and easy to understand. In other words, he should be a trained soil conservation surveyor.

CONSERVATION PLANS

Is your farm divided into fields according to the capabilities of the land? Do your field boundaries, roads, and fences follow the general contours of the land? Is all the land in each field suited for the same purpose? Are you using each acre of land for the thing it is best suited to do?

Do you know which conservation practices are needed on each field? Are you using terraces, strip crops, or cover crops on every field where they are needed to check erosion? Do you know how much and what kind of fertilizer or lime is needed on each field or pasture? Do you have for each field a crop rotation system that was tailor-made to fit that particular field?

Are your waterways planned so that they will drain

the excess water off the farm without damage to the land and without hurting any of your neighbors?

Do you have a grazing plan for each pasture that will let you get the most forage from the pasture without damage to the land? Do you have a plan for harvesting trees from your wood lot so that you will get the most timber without exposing the land to erosion? Do you have a plan for using the odd areas and wasteland for production of wildlife or some other useful crop?

Have you selected the best locations for ponds or soil-saving dams in the gullies or draws? Do you have accurate plans and specifications on how to build all needed conservation structures?

If you are going to practice conservation farming you should have a plan for doing all these things, as well as many others needed for soil and water conservation.

You hire an architect to draw up a detailed plan if you are going to construct or remodel a large building. Then you hire a construction engineer to supervise the construction. In like manner, you need a detailed plan if you are going to change your system

of farming and install all the needed conservation measures. You may be able to make the plan yourself, but the chances are that you will have a better plan if you get a specialist to help you.

The soil conservationists who work in soil conservation districts are specialists in making conservation farm plans. They have been trained to do this type of work, just as architects are trained to make plans for buildings. A staff of specialists from the Soil Conservation Service helps them on highly technical problems. The plans these technicians help make include instructions on how and when to make all the changes in land use and install all the conservation measures needed on each field. These plans are designed to fit the needs and capabilities of the land and suit the farmer's desires and needs.

TECHNIQUES OF APPLYING CONSERVATION PRACTICES

For some soil conservation jobs you probably don't need a technician to help you—that is, if you know for sure just what you want to do on each field. With a good rotation plan, you don't need a technician to help you rotate your crops. If you have suitable implements, you don't need help to practice stubble-mulch tillage. If you know just what kinds of grasses and legumes are best suited to the land, you don't need help in reseeding your pastures. You don't need help in spreading lime, fertilizer, and manure on a field, if you know how much and what kinds are needed. Nor do

you need help in practicing contour tillage, provided you know how to run a contour line. And there are other soil-conserving practices that most farmers can do without technical help, provided they have a good conservation plan.

But there are many conservation practices that you probably will want a technician to help you install, even though you already have a good conservation plan. You may only want assurance that you are doing the work right. You may just want help in surveying contour lines or in checking plans. You may need a technician, however, to supervise construction or check the completed work on conservation structures to see that they meet specifications. Technical accuracy may mean the difference between success and failure.

You can't afford to guess about the height of your newly built terrace ridges and fills. Nor can you afford to guess about the size and grade of the terrace channels. You should also know, for sure, whether your diversions, waterways, and water spreaders are of proper size and grade to do the job for which they were built. You must have accurate survey work for drainage and irrigation ditches. You can't afford to estimate the size of a dam or spillway on a farm pond. Such conservation structures should meet the needed specifications. If you are unable to supervise and check the technical accuracy of the work yourself, you should get a technician to do so.

How about the planting and harvesting of some special conservation crops that have been developed in

An experienced conservationist can help you make a farm conservation plan that will fit your land and suit your needs (left). This irrigation system (right) wasn't designed properly; much of the water is wasted and erosion is harming the land.





The bigger the job, the more important it is that you do it right. You can't afford to guess about the size and grade needed for a large drainage ditch (left). Some conservation practices do more harm than good if they are done wrong; this gully (right) was caused by emptying terrace water into an unprotected waterway.

conservation nurseries? You often need special types of equipment to plant and harvest some of these new crops. You may need technical advice on the rate, time, and depth of seeding.

You may need help in laying out a field for strip cropping or in running lines for contour farming on a field of irregular slope. And there are many other conservation jobs on which you may want technical help, unless you have had a lot of experience in conservation farming.

You will want an agricultural engineer to help you on many of the jobs for which you need technical aid. There are other jobs, however, on which you will want technical advice or help from an agronomist, a forester, a range conservationist, a biologist, or other scientist. You can get specialists from the Soil Conservation Service to help you on any of these jobs through your soil conservation district.

CONSERVATION FARMING

The conservation of soil and water is not a job that you can finish all at once; it is something that you must continue to do. It is a way of farming. And the experiences of thousands of farmers show that conservation farming is profitable.

If you get started right, conservation farming is not difficult. If you know what your land is capable of

doing, have a good conservation plan, and start applying your conservation practices in the right way, you will find that conservation farming is just a good way of farming. It is a natural way; you work with nature, not against her. Of course, you will run into some problems while practicing conservation farming; but you will be able to solve most of them if you know your land, know your plan, and have built your conservation structures right. And you can get technical help from your soil conservation district on any conservation problems that you are unable to solve yourself.

IF YOU DON'T DO THE JOB RIGHT

What happens if you use the wrong conservation practices or if you use the right practices the wrong way? In the first place, you never get full benefits from your conservation work unless it is done right. At times you get some benefits, even though you don't do the job right. Other times you waste only your labor and the money you spent installing the conservation practices. But there are times when you do more harm than good; you actually damage the land instead of conserving it.

If you use the wrong rotation, it is probably better than no rotation. If you plant the wrong kind of grass

on a pasture you seldom harm the land or the pasture, even though the grass doesn't grow very well. If you use the wrong kind of fertilizers you seldom hurt the land, though you usually hurt your pocketbook. If you plant shrubs in a gully and they wash out, you still have the growing gully, usually no worse than before. Such faulty practices seldom harm the land; often they return some benefit; but they don't do the job you intended them to do.

On the other hand, if you build a pond without an adequate spillway, the dam will probably wash out and you will have lost all the work you put into building the pond. The same will be true if you build a pond that fills with silt in a few years. If your drainage or irrigation ditches are not constructed properly, it may cost you more to fix them than it cost to build them in the first place.

Low spots in terraces will probably start gullies in your field; then your land will be in worse shape than if you had never terraced it. Your terrace channels may become gullies if you don't give them the correct grade. You will probably have a big gully if your terraces empty into a waterway that hasn't been suitably prepared beforehand. Moreover, a waterway in the

wrong place and with no protection against erosion may cause serious damage to your neighbors' land as well as your own land.

If you cut the timber from a woodland or plow up the sod on a pasture in order to cultivate land that is not suited for cultivation, you may find that you have destroyed a valuable crop and get little in return. Furthermore, your land will be exposed to erosion.

Numerous conservation practices will do more harm than good if you apply them in the wrong place or at the wrong time. And you lose the profits that might accrue from conservation farming if you don't do the job right.

CONSERVATION IS WORTH DOING RIGHT

The conservation of your soil and water is too important to wait until you find out, by trial and error, the best things to do. You should get the best technical help available. You owe it to yourself, your community, and the Nation to see that your land is conserved according to the best known scientific methods. Not only will it be better for the land; in the long run it will be cheaper and more profitable for you.



Technical Skill
for
**Soil and Water
Conservation**

